

Opposing Views

Attachment #5

Insect Activity is a Beneficial Natural Disturbance Event in the Forest

Note to the Responsible Official who reads these opposing views: The public deserves to consider projects proposed to occur on their land with the knowledge of the pros and cons of the project.

Insect Opposing Views #1 - “Defining forest health has proven to be something akin to shooting at a moving target. Different groups and different folks often mean different things when they use the term. Attempts to formulate a standard “one size fits all” definition have occupied untold hours of bureaucratic, professional and academic meetings, and consensus remains elusive. Why? To begin with, when we talk about forest health, it is necessary to identify the scale of our focus. Are we talking about a pine plantation, a particular forest ownership, a county, a state, a region, etc.? Such scale is not always defined, and is often prioritized differently by different people for varying reasons. Another reason seems to be that one’s concept of “healthy” is often inextricably linked to what he or she desires from the forest. What may be undesirable to forest managers emphasizing timber production may well be desirable to others interested primarily in wildlife habitat or biodiversity, and vice versa.”

Barnard, E. L. Ph.D. “**Forest Health Fundamentals**”
from *Forest Management*, 2004

http://www.fl-dof.com/forest_management/fh_fundamentals.html

Barry, Glen Ph.D. **"Insect Attacks May Benefit Colorado Forests"**
Forests.org, January 29, 2004
<http://forests.org/blog/2004/01/insect-attacks-may-benefit-col.asp>

Insects including those mentioned above are integral components of healthy forest ecosystems. These native species do less damage to the forest than the commercial logging program (which completely removes trees and nutrients from the ecosystem). In addition, these insect species are invaluable to the BHNH forest ecosystem. Insects help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs required by wildlife, and provide food to birds and small mammals. By feeding upon dead or dying trees, wood borers and bark beetles provide food to insect gleaning species of birds

(such as the black backed woodpecker which is listed as a MIS species on this Forest), create snags that may be utilized by cavity nesting birds in the future and overall are invaluable catalysts in forest evolution - often aiding immensely in the regrowth of forest after fires, blowdowns or other naturally occurring stand removing processes. The potentially significant direct, indirect, and cumulative impacts upon insects and upon the niche of insects in the BHNF forest ecosystem should be thoroughly analyzed in the FEIS.”

Black, Scott Hoffman Ph.D., Entomologist/Ecologist and Executive Director
The Xerces Society

Excerpt from a 2008 comment letter to Alice Allen Hell Canyon Ranger District
Black Hills National Forest

http://www.xerces.org/wp-content/uploads/2008/09/black_hills_comments.pdf

Insect Opposing Views #4 - “Insects, including those that feed on and sometimes kill trees, are integral components of healthy forest ecosystems. They help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs that wildlife and fish rely on, and provide food for birds and small mammals. Although insects have been a part of the ecology of temperate forests for millennia, many in the timber industry see them only as agents of destruction.

Some foresters believe the solution to the problem is increased logging. A review of over three hundred papers on the subject reveals that there is little or no evidence to support this assumption. There is an urgent need for federal and state agencies and land managers to reevaluate their current strategy for managing forest insects—which often relies on intensive logging—and to adopt a perspective that manages for forest ecosystem integrity.”

Black, Scott Hoffman Ph.D., Entomologist/Ecologist
and Executive Director, The Xerces Society for Invertebrate Conservation
2005 “**Logging to Control Insects: The Science and Myths
Behind Managing Forest Insect ‘Pests’**”

Insect Opposing Views #5 - “Even forest thinning, which is widely promoted as a solution by reducing tree susceptibility to outbreaks, has had mixed results and is unlikely to stem bark beetle epidemics on a large landscape scale, especially during drought cycles. Further, this type of thinning would not be a one-time treatment, but would require regular thinning of all treated stands every decade or so because thinning tends to promote rapid growth of understory vegetation, making it a potential fuel ladder. Moreover, too much thinning can moderate stand climates, which may be favorable to some beetles, and increase wind speeds adding to crown fire spread.”

“Scientists, land managers and residents of Colorado are concerned about how wildfire might affect our forests and communities. If the goal is to protect communities, fire-mitigation efforts should be focused around those communities and homes, not in remote and ecologically valuable areas.”

“These forests may look different to us, but beetle-affected forests are still functioning ecosystems that provide food and shelter for animals, cool clear water for fish and humans, and irreplaceable refuges for wildlife from the effects of logging, road building and climate change.” (Pp 23 and 24)

Black, S. H. Ph.D., D. Kulakowski Ph.D., B.R. Noon Ph.D., and D. DellaSala Ph.D. 2010. “***Insects and Roadless Forests: A Scientific Review of Causes, Consequences and Management Alternatives.***” National Center for Conservation Science & Policy, Ashland OR.
<http://nccsp.org/files/Insect%20and%20Roadless%20Forests.pdf>

Insect Opposing Views #6 - “The definition of forest health is continually being reevaluated. For instance, where once forest fires and insect infestations were seen as indicators of unhealthy forests, and thus great effort was made to suppress them, forest landowners and managers today are appreciating the long-term contributions that these conditions can make to a healthy ecosystem. It may be said that the standards by which we measure forest health are determined by the objectives we aspire to. Forests managed for maximum timber yield will require different criteria for judging forest health than those managed for old-growth forest purposes. Likewise, the health of forests adjacent to or in urban communities will be judged with criteria that are quite different from those used to judge forests in rural areas where population densities are quite low.”

Board on Agriculture. 1998 “**Forested Landscapes in Perspective: Prospects and Opportunities for Sustainable Management of America’s Nonfederal Forests**”
http://books.nap.edu/openbook.php?record_id=5492&page=205

Insect Opposing Views #7 - “Television commercials tell us that the only good bug is a dead bug. But stop a moment and think about all the important jobs insects do: they pollinate plants including trees, provide food for fish, birds, and other creatures, help decompose dead material, and make nutrients available to the forest. Insects keep our forests healthy.”

Calvert, Jeffrey Ph.D. “**A healthy forest needs bugs**”
California Forest Stewardship Program, 2002

Insect Opposing Views #8 - “On the basis of this review, we conclude that:”

“The mountain pine beetle and other bark beetles are native species and natural and important agents of renewal and succession in interior forests. Beetle outbreaks create diversity in forest structure, tree ages and species composition at stand and landscape scales, which are important for forest ecosystem health, diversity, and productivity. Beetle-killed trees provide ecological services and functions well beyond their death. At the landscape scale, beetle infestations create a mosaic of forest patches of various ages, densities, species composition and successional stages.”

“The current outbreak in central BC is a socio-economic challenge, rather than an ecological crisis. Mountain pine beetle outbreaks, like fire, are a natural disturbance to which interior forests are adapted and with which these forests have evolved for millennia.”

“Management interventions have never before controlled a large outbreak.”

“Sanitation and salvage clearcutting differ from natural disturbances in their effect on forest structure, and tend to reduce stand and landscape diversity. Natural disturbances vary in their intensity, frequency and magnitude, and amount and type of forest structure they retain. A large-scale clearcut is a stand replacement event that differs from a natural disturbance, especially in its intensity (percent of woody structures removed), frequency over time, and magnitude. Structural diversity at both the stand and landscape level is important for maintaining biodiversity and for the ability of ecosystems to resist and recover from fires, diseases, and other disturbances. Reducing stand and landscape diversity through harvesting may increase the susceptibility of these forests to large mountain pine beetle outbreaks in the future.”

“Current mountain pine beetle management fails to adequately ensure that ecological values are protected. The current legal framework allows ‘emergency’ exemptions from block-size requirements, terrain stability assessments, adjacency constraints and public review periods for operational plans. ‘Emergency’ logging may also occur in Old Growth Management Areas, Wildlife Habitat Areas, riparian reserves, Wildlife Tree Patches, Forest Ecosystem Networks, ungulate winter ranges, thus affecting the implementation of higher level planning, e.g., Land and Resource Management Plans.”

Drever, Ronnie Ph.D. and Josie Hughes 2001 “**Salvaging Solutions: Science-based management of BC’s pine beetle outbreak**”

A report commissioned by the David Suzuki Foundation, Forest Watch of British Columbia (a project of the Sierra Legal Defence Fund), and Canadian Parks and Wilderness Society – B.C. Chapter
http://www.davidsuzuki.org/files/Pine_beetle.final_w=cover2.pdf

Insect Opposing Views #9 - “Insects are a part of the complex forest ecosystem. Like all parts of the ecosystem they have a role to play and they interact with many other components. This group of organisms is incredibly diverse and their ecosystem functions are equally diverse. The ecological role of insects ranges from benefactor to killer, with the beneficial insects being the most abundant.

Pollination is an important role played by some insects. Wasps and bees pollinate flowering trees and shrubs.

Speeding up decay is another insect function. Insects such as ants, termites and wood boring beetles bore into the wood of dead trees, speeding up the invasion of wood decaying microbes.

Insects speed up nutrient cycling within the soil. Insects such as collembolans, thysanurans, beetles, and flies feed on organic matter and fungi, speeding the flow of nutrients to the soil.

Other insects can act as predators and parasites of herbivorous insect pests. Under normal conditions these natural enemies control these pest populations.

Insects also act as food sources for many insectivorous birds, amphibians and mammals.

These multiple roles indicate the complexity of insect functions in the forest ecosystem. Insects are involved in the ecological processes of the forest, including in forest stability, succession and productivity.

Over time, the insect populations of the host tree, attacking insects and insect enemies fluctuate and end up regulating the composition and abundance of each. This impacts ecosystem stability.

By feeding on unhealthy trees, insects help to re-cycle the nutrients from the dying trees to the healthy survivors. This maximizes the productivity of the average tree.

The number of beneficial or non-harmful insect species in a forest is large. They play many essential roles within the forest ecosystem.”

“Forest Protection – Insects”

Canfor Corporation, 2007

<http://www.canfor.com/treeschool/library/files/insects.asp>

Insect Opposing Views #10 - “Scourge. Epidemic. Pest.

All are words often used to describe the pine beetles currently wreaking havoc across large tracts of North America's forests.

Yet nature is too complex for good-versus-evil characterizations, says Cameron Currie, an Edmonton-born scientist whose recent work has discovered a potential upside to the notorious bugs.

While the pine beetle's power to destroy has been well-documented, it may also have the power to heal. Currie's research discovered the insect is associated with a bacterium containing an antibiotic compound that could eventually lead to new life-saving medicines." (Pg. 9)

Gerein, Keith "**Notorious pine beetle may be misunderstood**"

The Edmonton Journal, March 21, 2009

http://www.chetwyndecho.net/Issues/Issue_13_March_27_2009IWORK_-_website_PDF.pdf/

Insect Opposing Views #11 - "Before discussing the above points in more detail, it is important to specify what the term health as applied to a forest ecosystem means to me; I believe my views reflect those of most ecological scientists. A healthy system is one that retains the integrity of its basic structure and processes, including viable populations of indigenous species. Some level of disease and tree death is normal and beneficial in forests; ecosystem health is not so much the absence of disease and death as it is the ability to contain these natural forces within certain bounds and the robustness to resist or recover quickly from environmental stresses. These system properties of "resistance" and "resilience" are closely associated in turn with species diversity and in particular with the multiplicity of interactions among species that compose the system. Although healthy trees are prerequisite to healthy forest ecosystems, health encompasses much more than trees, and forest health correlates much more closely with structure and processes than with how fast trees are growing."

Perry, David A. Ph. D.
Testimony at a Senate Field Hearing on Forest Health
August 29, 1994
http://www.subtleenergies.com/ormus/Fire/D_PERRY.htm

Insect Opposing Views #12 - "Research has already shown that insects are a key in cycling nutrients, speeding decomposition and building soil fertility. It now appears they do far more than that.

It's becoming clear that major insect attacks are a powerful tool to shape the very species and structure of forests into one that's appropriate for the terrain and climate - and one that's sustainable.

In Oregon we've viewed the major insect epidemics simply as disasters. In fact, those destructive outbreaks are having an effect that's roughly comparable to fire. In some ways they're doing the forest underthinning that fire would have done and we should have done."

Defoliating and sap-sucking insects affect nutrient turnover. Wood boring insects penetrate bark and provide access for decomposers and water, accelerating decomposition. Outbreaks can open holes in the forest canopy. The surviving trees get a nutrient burst to improve their growth and health.

Something has to establish a balance between the available water, nutrients and the demands of plants. We finally came to realize that fire was a big part of that. Now we need to change our view of insects, because they too play a major role."

Schowalter, Tim Ph.D.,
"Insect epidemics a natural path to forest health?"
27-May-1997, *OSU News*

Insect Opposing Views #13 - “Native insects and diseases are intrinsic and necessary components of most terrestrial ecosystems. These and other natural disturbances, such as fire, are the drivers of forest diversity, structure, and function. Although at times devastating to the forest, they are necessary for the sustainability of forests (*Aber and Melillo 1991, Attiwill 1994*). Insects and diseases do cause economic harm. For the period 1982-1987, losses due to insects and diseases in Canada were estimated at over 100 million m³ annually or one third of the annual harvest (*Hall and Moody 1994*). Forest managers must balance volume loss without interfering with the necessary ecological functions that these agents provide to sustain a healthy forest.”

“Native Forest Insects and Diseases”

A publication of the Canadian Forest Service, 2003

http://www.health.cfs.nrcan.gc.ca/BorealShield/nativeInsectsAndDiseases_e.html

Insect Opposing Views #14 - “Although it may be relatively easy to ascertain whether an individual tree is healthy or not, the concept of “forest health” is very ambiguous. The presence of unhealthy trees does not necessarily imply that the forest as a whole is unhealthy. On the contrary, standing dead trees and fallen logs (coarse wood) play important roles in wildlife habitat, soil development, and nutrient cycling, and are a defining characteristic of old-growth forests. Bark beetle outbreaks rarely kill all of the trees in a stand, because they preferentially attack the larger trees and

Romme, W.H., J. Clement, J. Hicke, D. Kulakowski Ph.D.
L.H. MacDonald, T.L. Schoennagel Ph.D., and T.T. Veblen. 2006 **“Recent Forest Insect Outbreaks and Fire Risk in Colorado Forests: A Brief Synthesis of Relevant Research”**
http://www.cfri.colostate.edu/docs/cfri_insect.pdf

'There is now evidence that in many cases forests are more healthy after an insect outbreak,' said Tim Schowalter, an OSU professor of entomology.

with the result that outbreaks of pests may increase in size or frequency (Torgerson et al. 1990).

Logged stands have less diverse architecture and overall lower seed production than untouched stands. Consequently, logged stands have lower arthropod and small mammal diversity than undisturbed stands (Simard and Fryxell 2003). Mass annihilation of wood-decaying macrofungi and insect microhabitats from logging has an extremely detrimental effect on arthropod diversity (Komonen 2003), including on the natural enemies of pest insects. Sanitation and salvage logging differ from natural disturbance in their effects and tend to decrease habitat complexity and diversity, which can lead to an increase in insect activity (Hughes and Drever 2001).

Large-scale efforts for beetle control are economically and ecologically expensive, and the uncertain benefits of control efforts should be weighed carefully against their costs (Hughes and Drever 2001). Former U.S. Forest Service Chief Jack Ward Thomas, in testimony before the U.S. Senate Subcommittee on Agricultural Research, Conservation, Forestry, and General Legislation on August 29, 1994, acknowledged that “the Forest Service logs in insect-infested stands not to protect the ecology of the area, but to remove trees before their timber commodity value is reduced by the insects.”

Black, S.H. Ph.D. 2005. ***Logging to Control Insects: The Science and Myths Behind Managing Forest Insect “Pests.” A Synthesis of Independently Reviewed Research.***

The Xerces Society for Invertebrate Conservation, Portland, OR.

http://www.xerces.org/wp-content/uploads/2008/10/logging_to_control_insects.pdf

Insect Opposing Views #17 - “These results indicate that widespread removal of dead trees may not effectively reduce higher-severity fire in southern California’s conifer forests. We found that sample locations dominated by the largest size class of trees (>61 cm diameter at breast

height (dbh)) burned at lower severities than locations dominated by trees 28-60 cm dbh. This result suggests that harvesting larger-sized trees for fire-severity reduction purposes is likely to be ineffective and possibly counter-productive.” (Pg. 1)

“We found that stands with recent high pre-fire tree mortality due to drought and insects did not burn at higher severity in coniferous forests of the San Bernardino Mountains, southern California, in the two fires we examined. Pollet and Omi [32] reported anecdotally that stands of lodgepole pine (*P. contorta*) that experienced an insect epidemic in the 1940s in Yellowstone National Park burned at lower severities compared to adjacent burned areas in the 1994 Robinson Fire. A widespread low-severity fire in subalpine forests in the White River National Forest, Colorado did not burn any beetle-affected stands [13]. Further, Bebi *et al.* [12] found that stands of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*A. lasiocarpa*) in the White River National Forest influenced by a spruce beetle outbreak in the 1940s did not show higher susceptibility to 303 subsequent forest fires that burned after 1950.” (Pgs. 45 and 46)

Bond, Monica L., Derek E. Lee, Curtis M. Bradley and Chad T. Hanson Ph.D. .
**“Influence of Pre-Fire Tree Mortality on Fire Severity in Conifer Forests of
the San Bernardino Mountains, California”**
The Open Forest Science Journal, 2009, 2, 41-47
http://www.biologicaldiversity.org/publications/papers/Bond_et_al.pdf

Insect Opposing Views #18 - “A new study in the lodgepole pine forests of the greater Yellowstone region concludes that rather than increasing the wildfire risk, beetle attacks reduce it by thinning tree crowns.”

“The researchers used satellite imagery to map lodgepole stands attacked by mountain pine beetles, a type of bark beetle, then hiked into the areas to confirm the beetle damage and measure fuel loads. Then they ran computer models to predict fire behavior.”

Boxall, Bettina **"Bark beetles may kill trees, but that may not raise fire risk"**
Los Angeles Times, September 26, 2010
<http://articles.latimes.com/2010/sep/26/nation/la-na-beetle-fire-20100926>

Insect Opposing Views #19 - " "The primary driver of fire is not beetle kill. It's climate," said Barry Noon, a wildlife ecology professor at [Colorado State University](#) and an author of the report. "It's drought and temperature."

The report warns against using tax dollars to fund widespread forest-thinning efforts, particularly in roadless areas that have been off-limits to logging.

Instead, the authors encourage efforts to be focused around the edges of communities.

"We're certainly not arguing against cutting down some of these trees, but we think that the cutting effort needs to be focused around communities and homes," Noon said. "It makes little sense to have wide-scale cutting of these trees." "

Frey, David **"Logging Won't Halt Beetles, Fire, Report Says"**
NewWest Travel and Outdoors, 3/03/10
http://www.newwest.net/topic/article/logging_wont_halt_beetles_fire_report_says/C41/L41/

Insect Opposing Views #20 - “Although the scale of the recent beetle outbreak is unprecedented in modern times, experts note that insect outbreaks and fires are a natural part of Western forest ecosystems. As such, the report found no causal link between insect outbreaks and the incidence of wildfire.

Moreover, the authors found that tree cutting “is not likely to control ongoing bark beetle outbreaks,” nor will it be “likely to alleviate future large-scale epidemics.”

“Despite nearly 100 years of active forest management to control the mountain pine beetle, there is very little evidence to suggest that logging is effective, especially once a large-scale insect infestation has started,” Black said. Black noted that even logging dead trees could make things worse from an ecological standpoint, since their removal eliminates habitat for parasites and insect predators. Logging can also seriously damage soil and roots, leading to greater stress on remaining trees and increasing their susceptibility to outbreaks.”

Gable, Eryn “Battling beetles may not reduce fire risks – report”

Land Letter, March 4, 2010

<http://www.xerces.org/2010/03/04/battling-beetles-may-not-reduce-fire-risks-report/>

Insect Opposing Views #21 - “Although ongoing outbreaks understandably have led to widespread public concern about increased fire risk, the best available science indicates that outbreaks of mountain pine beetle and spruce beetle do not lead to an increased risk of fire in the vast majority of forests that are currently being affected. We should not let the effects of bark beetle outbreaks, as spectacular as they may be, distract us from the real risk. The real concern is that we have built homes, communities, ski resorts, and other infrastructure in inherently flammable ecosystems. The ongoing outbreaks have not increased the risk of wildfire as much as they have drawn attention to the risk that has been there long

before the outbreaks began. Forests of lodgepole pine and spruce-fir are prone to high-severity fires during drought conditions, regardless of the influence of bark beetle outbreaks.” (Pg. 5)

Kulakowski, Dominik Ph.D.

Assistant Professor, Clark University

Testimony before the Subcommittee on Public Lands

and Forests of the Energy and Natural Resources

Committee of the United States Senate

April 21, 2010

http://energy.senate.gov/public/_files/KulakowskitestimonyonS2798042110.pdf

Insect Opposing Views #22 - “The mountain pine beetle is a native insect, having co-evolved as an important ecological component of western pine forests. The inter-relationship between beetle-caused mortality and subsequent fire has resulted in a basic ecological cycle for many western forests (Schmidt 1988).

Some pines species, such as lodgepole pine, are maintained by periodic disturbances. The lodgepole pine forest-type¹ typically is an essential monoculture of even-aged trees that were initiated by a catastrophic, stand-replacing fire. Without the influence of fire (Fig. 1B), lodgepole pine would be lost over much of its native range (Brown 1975, Lotan et al. 1985). Fire serves to prepare the seedbed, releases seeds from the serotinous cones (triggered to release seeds by heat of a fire), and eliminates more shade-tolerant species such as spruce or fir that would eventually out-compete and replace the early seral lodgepole pine.”

Logan, Jesse A. Ph.D. and James A. Powell Ph.D.

Ghost Forests, Global Warming and the Mountain Pine Beetle (Coleoptera: Scolytidae)

AMERICAN ENTOMOLOGIST • Fall 2001

http://www.usu.edu/beetle/documents/Logan_Powell01.pdf

Insect Opposing Views #23 - “The sheer number of diverse opinions about how the mountain pine beetle epidemic will ultimately impact Wyoming's ecosystem suggests that there's no single strategy the state should employ in its forests at this time. There are simply too many unknowns, so scientists, conservationists and state officials are better off adopting a "wait and see" attitude than taking action now they might regret in the future.”

“But it's clear that Wyoming would be best served if all parties view the beetle epidemic as a scientific issue and not a political one. Political solutions can be expedient, but in hindsight often prove to be costly mistakes.”

“Some observers worry that the dead trees will create a significantly higher fire danger. Others suggest that the fire danger has been exaggerated. A study of lodgepole pines in the greater Yellowstone region, for example, concluded that beetles actually reduce the risk of wildfires by thinning tree crowns. Some experts note that wildfires are just as likely to erupt in green, healthy forests as they are in beetle-killed forests.”

“But what should be done with the trees killed by beetles? Logging is one potential answer. The U.S. Forest Service, using a \$40 million grant to clear beetle-killed trees, recently announced plans to cut about 14,000 acres of trees near communities and in more than 350 recreation sites in Wyoming and Colorado. Skeptical environmental groups, however, argue forestry officials are simply using the beetle epidemic as an excuse to do more logging on protected land.”

“Wyoming can't afford to let those fears result in wasting millions of state and federal dollars fighting the epidemic and letting industry rush to chop down dead trees. Wyoming's best chance to make wise, informed

decisions is to follow the science, and be willing to be nimble as data and test results change.”

“Science should lead pine beetle epidemic solutions”

Star-Tribune Editorial Board

Wyoming Star Tribune, October 3, 2010

http://trib.com/news/opinion/editorial/article_f87d7db9-ed2a-5620-8d66-20556935c592.html

Insect Opposing Views #24 - “The idea that beetle damaged trees increase fire risks seems a logical assumption – dead trees appear dry and flammable, whereas green foliage looks more moist and less likely to catch fire. But do pine beetles really increase the risk of fire in lodgepole pine forest? University of Wisconsin forest ecologists Monica Turner and Phil Townsend, in collaboration with Renkin, are studying the connection in the forests near Yellowstone National Park. Their work -- and their surprising preliminary results -- are the subject of [the NASA video](#).”

Link to the video:

http://svs.gsfc.nasa.gov/vis/a010000/a010600/a010634/G2009-098_Wildfire_and_Beetles_ipod_lg.m4v

“Their preliminary analysis indicates that large fires do not appear to occur more often or with greater severity in forest tracts with beetle damage. In fact, in some cases, beetle-killed forest swaths may actually be less likely to burn. What they're discovering is in line with previous research on the subject.”

“The results may seem at first counterintuitive, but make sense when considered more carefully. First, while green needles on trees appear to be more lush and harder to burn, they contain high levels very flammable volatile oils. When the needles die, those flammable oils begin to break

Tinker, Daniel B. Ph.D. et al., 2010 “**Reciprocal interactions between bark beetles and wildfire in subalpine forests: landscape patterns and the risk of high-severity fire**”

A research paper sponsored in part by the Joint Fire Science Program

http://landscape.zoology.wisc.edu/October%202009%20updates/JFSP_FnlRep_30Sept2009.pdf

Insect Opposing Views #26 - “The current pine beetle “outbreak” that has led to tree mortality among Rocky Mountain forests has prompted some people to suggest that beetles are “destroying” our forests and that beetle-killed trees will invariably lead to larger wildfires.

At the heart of this issue are flawed assumptions about wildfires, what constitutes a healthy forest and the options available to humans in face of natural processes that are inconvenient and get in the way of our designs.

While it may seem intuitive that dead trees will lead to more fires, there is little scientific evidence to support the contention that beetle-killed trees substantially increase risk of large blazes. In fact, there is evidence to suggest otherwise.”

Wuerthner, George

Pine Beetle Fears Misplaced

Helena Independent Record, March 25, 2010

http://helenair.com/news/opinion/article_f3d671f0-37c9-11df-921d-001cc4c002e0.html